



## Goddard Procedural Requirements (GPR)

**DIRECTIVE NO.** GPR 1280.1E  
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**APPROVED BY Signature:** Original Signed By  
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### **COMPLIANCE IS MANDATORY**

**Responsible Office:** 300 / Safety and Mission Assurance Directorate

**Title:** The GSFC Quality Manual

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CHECK THE GSFC DIRECTIVES MANAGEMENT SYSTEM AT  
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## **PREFACE**

### **P.1 PURPOSE**

The purpose of the Goddard Space Flight Center (GSFC) Quality Manual is to define the GSFC Management System (MS) as implemented at Greenbelt, Maryland, and Wallops Flight Facility (WFF), Wallops Island, Virginia.

### **P.2 APPLICABILITY**

The Quality Manual applies to all organizational elements, their assigned personnel (civil-servant and contractor) and infrastructure utilized for the performance of work that is identified as in-scope of the GSFC MS, the Center's certification to ISO 9001-2008, and the Center's compliance to AS9100C. The scope of the GSFC MS includes each of the following processes for activities involving Technology Readiness Levels (TRL) 4-9 *and* when such activity is formally managed in accordance with National Aeronautics and Space Administration (NASA) Procedural Requirement (NPR) 7120.5 (NASA Space Flight Program and Project Management Requirements), or 7120.8 (NASA Research and Technology Program and Project Management Requirements):

- a. Science Enabling - This includes the grants process; providing data to the science community; science support tools; the proposal support process; and the science research process.

b. Technology Development - This includes the technology research and development management process; mission-specific products; technology transfer process; and technology commercialization.

c. Systems Development - This includes space flight systems; sounding rocket, aircraft and balloon carrier systems; and ground-based mission operating and data acquisition systems. Sounding rocket and balloon experiment payload development is included where external commitments exist or where needed to meet the safety, interface control, or operational requirements of the carrier systems.

d. Program/Project Management - This includes cost, schedule, and technical control; review and reporting; procurement; mission operations; and safety and mission assurance.

e. Knowledge Communication - This includes the research publication process and the maintenance of those databases accessible to the public whereby the results of GSFC research are shared.

NOTE: TRLs are defined as follows:

- TRL 2: Technology concept and/or application formulated
- TRL 3: Analytical and experimental critical function and/or characteristic proof-of-concept
- TRL 4: Component and/or breadboard validation in laboratory environment
- TRL 5: Component and/or breadboard validation in relevant environment
- TRL 6: System/subsystem model or prototype demonstration in a relevant environment (ground or space)
- TRL 7: System prototype demonstration in a space environment
- TRL 8: Actual system completed and “flight qualified” through test and demonstration (ground or space)
- TRL 9: Actual system “flight proven” through successful mission operations

National Aeronautics and Space Administration (NASA) GSFC will have no exclusions from AS9100C and ISO 9001-2008 requirements. Unless the deviation/waiver process is addressed in a requirements document, deviation/waiver requests against a GPR or other Center-level MS requirement are documented and processed in accordance with GPR 1400.1, Waiver Processing, using GSFC Form 4-52, GSFC Waiver Request.

Deviation/waiver requests involving Procedures and Guidelines (PG), Work Instruction (WI) or other localized MS requirements are prepared by the requesting organization for the approval of the authority that established the requirement.

Requests involving localized requirements that could result in a noncompliance with a Center-level requirement are accomplished using GSFC Form 4-52. Deviation/waiver requests against GSFC processes do not offer relief from the requirements of ISO 9001-2008 and AS9100C.

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### **P.3 AUTHORITIES**

- a. NPD 1280.1, NASA Integrated Management System Policy
- b. NPD 1000.3, The NASA Organization
- c. NPD 1001.0, NASA Strategic Plan

### **P.4 APPLICABLE DOCUMENTS**

- a. NPD 8730.5, NASA Quality Assurance Program Policy
- b. NPR 7120.5, NASA Space Flight Program and Project Management Requirements
- c. NPR 8730.2
- d. FAR Subpart 46.2, Contract Quality Requirements
- e. Aerospace Standard AS9100C, Quality Management Systems – Requirements for Aviation, Space and Defense Organizations
- f. ISO 9001-2008, Quality Management Systems – Requirements
- g. All GSFC MS Directives listed in Appendix C

### **P.5 CANCELLATION**

- a. GID 1280.1, The GSFC Quality Manual
- b. GPR 1280.1D, The GSFC Quality Manual

### **P.6 SAFETY**

MS safety requirements are identified as appropriate in governing directives and procedures.

### **P.7 TRAINING**

Specific training requirements are identified as appropriate in governing directives and procedures.

## P.8 RECORDS

Record Title	Record Custodian	Retention
Original approved waivers of Center requirements (project-specific requirements) Original approved waivers of Center requirements (non project-specific requirements)	Project within the waiver scope	*NRRS 8/103 – Destroy/delete between 5 and 30 years after program/project termination.  Use appropriate NRRS retention schedule as determined by the requirement being waived. Contact the Center Records Manager.
Approved waivers and deviations of Directorate or sub-Directorate MS requirements (e.g., PG or WI requirements)	(1) Organization that approved the waiver or deviation; (2) Individual or organization that requested the waiver. See Note below.	(1) *NRRS 1/26.5A - Destroy when 7 years old. (2) *NRRS 1/26.5B- Destroy when 3 years old or when no longer needed, whichever is sooner.
Management System Files: Monthly Reporting of Customer Satisfaction Metrics, Internal Audit Results, Process Performance and Product Conformity, Status of Corrective and Preventive Actions, Proposed MS Changes/ Improvement Recommendations, MS Issues, and Follow up Actions From Above Reports	Per GPR (1) Primary Office (2) All other offices	(1) *NRRS 1/26.5A -Destroy when 7 years old. (2) *NRRS 1/26.5B- Destroy when 3 years old or when no longer needed, whichever is sooner.

\*NRRS – NASA Records Retention Schedules ([NPR 1441.1](#))

Note: Record (1) is the original signed record. Record (2) is a copy.  
Other MS records are identified as appropriate in governing directives and procedures.

## P.9 MEASUREMENT/VERIFICATION

MS metrics are identified as appropriate in accordance with GPR 1280.1, Section 5.4.

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## PROCEDURES

In this document, a requirement is identified by “shall,” a good practice by “should,” permission by “may” or “can,” expectation by “will,” and descriptive material by “is

### 1 MANAGEMENT SYSTEM

#### 1.1 General Requirements

GSFC maintains an established Management System (MS) through implementation of this manual and referenced documented procedure as a means of ensuring that product and services conform to customer requirements and to provide a framework for continually improving its effectiveness with the requirements of the ISO 9000-2008 and AS9100C standards. This quality manual references supporting MS directives and procedures that identify the MS processes and their application throughout GSFC. As a reference aid, the Safety and Mission Assurance Directorate (SMA-D) maintains a listing of the directives established for the MS that describe the GSFC processes. This reference aid is accessible via the [GSFC MS web page](https://gsfcmanagementsystem.gsfc.nasa.gov/index.cfm) at: <https://gsfcmanagementsystem.gsfc.nasa.gov/index.cfm>

#### 1.2 Documentation Requirements

The NASA GSFC Process map is located in Appendix D. It illustrates how the organizations processes interrelate relative to the ISO 9001-2008 and AS 9100Rev C standard.

##### 1.2.1 General

The GSFC MS documentation consists of:

- This Quality Manual, which defines the Quality Policy (see Section 2.3) and statements of objectives (see Section 2.4.1);
- Documented procedures required by ISO 9001-2008, AS9100C, and GSFC to ensure the effective planning, operation and control of processes (Appendix C);
- MS Records (as identified in governing directives); and
- All other MS records.

##### 1.2.2 Quality Manual

This Quality Manual has been prepared to describe the GSFC MS. The scope and any permissible exclusions are described in section P.2 of this manual. Each section of the manual references documented MS procedures relating to the ISO 9001-2008/ AS9100C requirements outlined in that section as applicable.

### 1.2.3 Control of Documents

GSFC has documented procedures for the control of its Management System documentation and data. Goddard Policy Directives (GPDs), Goddard Procedural Requirements (GPRs), Goddard Interim Directives (GIDs), Procedures and Guidelines (PGs), and Work Instructions (WIs) are prepared and maintained within the Goddard Directives Management System (GDMS). Documents or data that define requirements, plans, design, build, interface, and production information are controlled documents subject to approval before issuance or alteration. All of the MS documented procedures are controlled according to the document control procedures listed below.

- a. GPR 1410.1 Directives Management;
- b. GPR 1410.2 Configuration Management
- c. GPR 1420.1 Forms Management; and
- d. GPR 8070.5 GSFC Technical Standards.

The procedures listed define the processes for:

- a. Approving documents for adequacy prior to use;
- b. Reviewing and updating as necessary and revalidating documents;
- c. Ensuring that changes and current revision status of documents are identified;
- d. Ensuring that relevant versions of applicable documents are available at points of use;
- e. Ensuring that documents remain legible and readily identifiable;
- f. Ensuring that documents of external origin are identified and their distribution controlled;
- g. Preventing the unintended use of obsolete documents and to apply suitable identification to them if they are retained for any purpose;
- h. Obtaining customer/ regulatory agency approvals when required by contract or regulatory requirements; and
- i. Coordinating document changes with customers or regulatory authorities in accordance with contract or regulatory requirements.

### 1.2.4 Control of Records

Records are controlled to provide evidence of conformity to requirements and of the effective operation of the MS. The records, including those created by or controlled by suppliers, are controlled according to GPR 1440.8, Records Management. This procedure requires that MS records remain legible, readily identifiable and retrievable. Records are available for review by customers and regulatory authorities in accordance with contract or regulatory requirements.

## **2 MANAGEMENT RESPONSIBILITY**

### **2.1 Management Commitment**

The Center Director and senior center leadership, including Directors of and Functional Office Heads are committed to the development, implementation and continual improvement of the effectiveness of the MS.

The Quality Policy established in this Quality Manual is to enhance the GSFC ability to achieve program, institutional and Agency goals and objectives as stated in NPD 1001.0, NASA Strategic Plan.

The Center Director and senior center leadership, including Directors of and Functional Office Heads provide evidence of commitment by communicating to the organization the importance of meeting customer requirements as well as statutory and regulatory requirements pertaining to GSFC product, (see sect. 2.4.1 Quality objectives), conducting management reviews, and ensuring the availability of resources.

### **2.2 Customer Focus**

Through management reviews and established lines of authority, senior management ensures that external customer requirements are determined and are met with the aim of enhancing customer satisfaction. Product conformity and on-time delivery are measured and appropriate action is taken when they are not or will not be achieved.

### **2.3 Quality Policy**

#### **GSFC QUALITY POLICY**

With customer satisfaction as our primary goal:

- GSFC is committed to achieve excellence in all of our efforts
- Meet our customers' requirements
- Continually improve our processes

The Center Director and senior center leadership, including Directors of and Functional Office Heads ensure that the Policy is appropriate for the purpose of GSFC.

Every GSFC manager and supervisor involved in work that is applicable to the MS is responsible for ensuring that the Quality Policy is understood, implemented, and maintained at all levels of their organization.



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## 2.4 Planning

### 2.4.1 Quality Objectives

GSFC's quality objectives are consistent with the GSFC Quality Policy and governed by NPD 1280.1, NASA Integrated Management System Policy and are established within each organization. These objectives are further established by functions within the organization relative to meeting the requirements of the product.

### 2.4.2 Management System Planning

The GSFC Management System Committee (MSC) is made up of representatives from each Directorate and functional office, and chaired by the MS Representative. The MSC is responsible for advising the MS Representative regarding MS administration, maintenance, and status reporting.

Responsibility for the planning of the MS resides with the MS Representative and the MSC. The MSC ensures that the integrity of the MS is maintained when MS changes are planned and implemented.

The MSC is responsible for the analysis of data, gathered through various tools and activities, on the implementation and effectiveness of the MS. The purpose of these analyses is to discern trends and opportunities for preventive action or continual improvement initiatives from a Center perspective. The results of these analyses and recommended actions are reported to Center management as part of MS Management Reviews or in more immediate reporting opportunities.

## 2.5 Responsibility, Authority and Communication

The GSFC Management Organizational Chart is located at:  
<http://www.nasa.gov/centers/goddard/about/organizations/org2.html>

### 2.5.1 Responsibility and Authority

The Center Director is given the authority by the Agency to manage all aspects of GSFC within Government and Agency laws and regulations. This includes authority to implement, maintain, and improve the MS.

The Center Director delegates responsibility and authority over the MS to the MS Representative, which flows down to senior center leadership, including Directors of and Functional Office Heads and to all managers and supervisors at the Center.

Every GSFC manager and supervisor involved in work under the scope of the MS is responsible for maintaining and implementing the MS within their organizations, including establishing and documenting the necessary procedures, guidelines, and work instructions. This

responsibility includes ensuring that their employees operate in compliance with the MS, take appropriate actions when processes do not produce the required quality, and continually seek to improve processes.

### **2.5.2 Management System Representative**

The Management System Representative (MS Representative), appointed by the Center Director, is responsible for ensuring that the MS is established, implemented and maintained across the Center. The MS Representative reports to senior management and/or directly to the Center Director on the performance of the MS and opportunities for improvement. This reporting process also ensures promotion of awareness of customer requirements throughout the organization. The MS Representative is responsible for reviewing the GSFC Quality Manual and recommending revisions to ensure the Manual is maintained in a current status. The MS Representative has the organizational freedom and unrestricted access to top management to resolve quality management issues.

### **2.5.3 Internal Communication**

Internal communication takes place regularly during MS management reviews and resulting actions are accessible to all employees throughout the organization through their managers. Methods for communicating and flowing down MS effectiveness include, but are not limited to the following:

- a. Weekly Tag-up/staff meetings;
- b. All-hands meetings;
- c. E-mails;
- d. One-on-one discussions with employees;
- e. Monthly Status Reviews (MSR);
- f. Quarterly Status Reviews; and
- g. Gateway Reviews.

## **2.6 Management Review**

The GSFC MS is reviewed monthly by the MS Committee (MSC) and at predetermined intervals by top management. These reviews include information related to the following inputs:

- a. results of audits;
- b. Customer feedback;
- c. process performance and product conformity;
- d. status of preventive and corrective actions;
- e. follow up actions from previous management reviews;
- f. changes that could affect the management system including quality policy and objectives; and
- g. Recommendations for improvement.

Outputs from these reviews are flowed up to the Institutional Operations Council (IOC), which is defined in GPR1060.3, the Goddard Governance System. These outputs include decisions and actions related to:

- a. improving the effectiveness of the management system and processes;
- b. improving the product(s) related to customer requirements; and
- c. resource needs.

### **3 Resource Management**

#### **3.1 Provision of Resources**

GSFC allocates resources to manage and perform the work required to meet the customer commitments. The resources provided are consistent with the GSFC Strategic Plan and formally allocated via the annual Planning, Programming, Budgeting, and Execution (PPBE) process. The required resources are identified by Project Managers as defined in GPR 8700.1, and are provided by the Center Director through the Performing Directorate or through the Functional Staff Office. Each Directorate plans and allocates resources for the continual improvement of its work process.

#### **3.2 Human Resources**

##### **3.2.1 General**

To ensure competence of GSFC personnel, position descriptions are prepared to identify the qualifications required for each position that affects product quality. Qualifications include requirements for education, skills and experience. Appropriate qualifications, along with required training, provide the competence required for each position.

##### **3.2.2 Competence Awareness and Training**

Qualifications are reviewed and screened prior to hire, when an employee changes positions or the requirements for a position change. The Office of Human Capital Management (OHCM) and/or the employee's supervisor maintain records of employee qualifications. If any additional training is required to meet new requirements for a particular job or task, or if there is a difference between the employee's qualifications and the job requirements, training or other action is taken to provide the employee with the necessary competence to perform the job or task. The results are then evaluated to measure effectiveness. All employees are trained on the relevance and importance of their activities and how they contribute to the achievement of the quality objectives. GPR 3410.2, Employee Task-Specific, Required and Mandatory Training Requirements identifies the competence awareness and training process used at GSFC.

### **3.3 Infrastructure**

GSFC determines and provides the infrastructure needed to meet quality objectives and product requirements. The infrastructure includes buildings, workspace, utilities, laboratories, process equipment, and supporting services. As new infrastructure requirements arise, they are documented, in MS plans. Existing infrastructure is maintained to ensure product conformity.

### **3.4 Work Environment**

GSFC maintains a work environment suitable for achieving product conformance. Requirements are determined during MS planning and documented in its appropriate plan. The work environment is managed for continual suitability. In order to maintain a well working infrastructure, regular inspections and calibrations are made, as well as, preventive maintenance of buildings and equipment. Data from the MS is evaluated to determine if the work environment is sufficient for achieving product conformance, or if corrective and preventive action related to the work environment is required.

## **4 Product Realization**

### **4.1 Planning of Product Realization**

The realization of GSFC products and services is directed by this Quality Manual and the referenced MS documentation hierarchy can be found in the GSFC GDMS. This document hierarchy defines how requirements for quality and the MS are met. GSFC Directorate Management, Technical Leads and Process Owners determine which processes need to be formally defined and documented. Planning for product realization must be consistent with other defined quality processes of the MS. Project plans, in accordance with NPR 7120.5, identify the set of plans that will be used to manage and execute the project. Quality planning is required and is captured in Mission Assurance Requirements document (MARs), before new products or processes are implemented. The quality planning may take place as a design project, or according to the Planning of Product Realization. During this planning, Directorates management or assigned personnel identify:

- a. The quality objectives and requirements for the product or service;
- b. Processes, documentation and resources required;
- c. Verification, validation, monitoring, measurement, inspection and test requirements;
- d. Configuration management appropriate to the product;
- e. Criteria for product acceptance;
- f. Resources to support maintenance and operation of the product; and
- g. The output of quality planning includes documented quality plans, processes, procedures and design outputs.

#### 4.1.1 Project Management

GSFC emphasizes program and project management based on life cycles, Key Decision Points (KDPs), and evolving products during each lifecycle phase. These are flowed down from NPR 7120.5, NASA Space Flight Program and Project Management Requirements and are embedded in NASA's four-part process for managing programs and projects, consisting of:

- a. Formulation – the identification of how the program or project supports the Agency's strategic needs, goals and objectives; the assessment of feasibility, technology, and concepts; risk assessment, team building, and development of operations concepts and acquisition strategies; establishment of high level requirements and success criteria; the preparation of plans, budgets, and schedules essential to the success of a program or project; and the establishment of control systems to ensure performance to those plans and alignment with current GSFC and Agency strategies;
- b. Approval (for Implementation) - the acknowledgement by the decision authority that the program/project has met stakeholder expectations and formulation requirements and is ready to proceed to implementation. By approving a program/ project, the decision authority commits the budget resources necessary to continue into implementation;
- c. Implementation - the execution of approved plans for the development and operation of the program/project, and the use of control systems to ensure performance to approved plans and requirements, and continued alignment with GSFC and the Agency's strategic needs, goals, and objectives; and
- d. Evaluation - the continual self, independent assessment of the performance of a program/project and incorporation of the assessment findings to ensure adequacy of planning and execution according to approved plans and requirements.

NPR 7120.8, NASA Research and Technology Program and Project Management Requirements establishes the program and project management requirements by which NASA will formulate and execute research and technology (R&T), consistent with the governance model contained in NASA Policy Directive (NPD) 1000.0, NASA Strategic Management and Governance Handbook.

#### 4.1.2 Risk Management

GSFC maintains Risk Management processes that meets the intent and satisfies the requirements of ISO 9001-2008/AS 9100C standards. GPR 7120.4, Risk Management includes:

- a. The assignment of responsibilities for risk management;
- b. Definition of risk criteria;
- c. Identification, assessment and communication of risks throughout production realization;
- d. Identification, implementation and management of actions to mitigate risks that exceed the defined risk acceptance criteria; and
- e. Acceptance of risks remaining after implementation of mitigation actions.

### 4.1.3 Configuration Management

Details of GSFC's Configuration Management (CM) requirements and processes are documented in GPR 1410.2, Configuration Management process. All GSFC organizations having Configured Items (CIs) implement CM processes that comply with the requirements of GPR 1410.2. Project Managers having configuration items continually evaluate the effectiveness of their CM processes. Reviews of CM status accounting reports are conducted with their configuration managers at least quarterly, analyzing for trends, recurring delays, excessive changes to specific systems, and other factors that lead to opportunities for process improvement. Similarly, heads of organizations without configuration items review their document control processes at least quarterly with their document managers, with equivalent criteria and objectives. GSFC CM Procedures include the following:

- a. Configuration Identification Requirements for Controlled Documents;
- b. Configuration Change Requests (CCR's);
- c. External Documents;
- d. In House product Configuration Management; and
- e. Control for Organizations not having Configuration Items;

### 4.1.4 Control of Work Transfers

GSFC conducts temporary or permanent transfer of work (e.g., from one organization facility to another, from the organization to a supplier, from one supplier to another supplier). GSFC Manufacturing Engineering Group manages all outside fabrication. The Fabrication Manager of that specific program/ project determines the specific requirements to be solicited referencing baselined design drawings, and other controlled design, fabrication and manufacturing drawings. The Fabrication Manager outsources fabrication services and generates a Certification Log for each part, per 547-PG-8072.1.1 and GPR 4520.2, respectively.

## 4.2 Customer Related Processes

### 4.2.1 Determination of Requirements Related to the Product

GSFC determines the requirements related to products and services using the following:

- a. Product requirements specified by the customer;
- b. Requirements not stated by the customer, but still necessary to achieve quality objectives (see 2.4.1) and customer satisfaction;
- c. Statutory and regulatory requirements as referenced in a contract;
- d. Any additional requirements determined by GSFC organizations; and
- e. Requirements for delivery and post-delivery activities.
- f. Through customer agreements as required by GPD-1050.1 Space Acts Agreement Process

## **4.2.2 Review of Requirements Related to the Product**

GSFC reviews the requirements related to the product prior to the commitment to supply the product and at various stages of a project/program lifecycle. Different system level reviews are conducted at critical project/ product milestones in accordance with GPR 8700.4, Goddard Systems Reviews (GSRs).

In addition, Engineering Peer Reviews (EPRs), GPR 8700.6, are conducted which provide input to the GSR, resulting in a robust GSR. The adequacy and quality of an EPR activity is also assessed at the GSR. Areas of review during EPR are extensive and depending on what needs to be reviewed; those subjects are included in the review planning.

## **4.2.3 Customer Communication**

GSFC applies a project management model, as described in NPR 7120.5, to ensure frequent and meaningful communication with customers. Product information is conveyed through design reviews and key decision points. Design changes are controlled through the configuration change process described in GPR 1410.2. Review feedback is collected and dispositioned through requests for action. Operations feedback is collected through customer satisfaction surveys and customer performance reports.

In addition, GSFC communicates with the customers in relation to:

- a. Product information;
- b. Enquiries, contracts and order handling including amendments;
- c. Customer feedback including customer complaints; and
- d. Service support, including Return Material Authorization (RMA), warranty and repairs.

## **4.3 Design and Development**

### **4.3.1 Design and Development Planning**

GSFC implements GPR 8700.1, Design Planning and Interface Management, which establishes the process for providing design planning. This procedure defines the process for developing design plans and devising methods for managing organizational and technical interfaces for the development of all GSFC products and processes covered by the scope of the GSFC MS. A Product Design Lead (PDL) is selected and assigned by the Code 500 Applied Engineering and Technology Directorate to establish the goals and objectives for the design process as a baseline for all subsequent planning activity. Where appropriate, this includes the development of requirements and/or specifications for the product or service being designed. The design requirements are traceable to the customer requirements (see GPR 1310.2). Design planning includes:

- a. Design and development stages including organization, task sequence, mandatory steps, significant stages and configuration control;



- b. Required design reviews, verification and validation appropriate to each design stage;
- c. Responsibilities and authorities for design and development;
- d. Verification and Validation methods appropriate to each design and development stage;
- e. Identification of the technical interfaces required for the project;
- f. Updating the design plan as the project progresses; and
- g. The different design and development tasks to be carried out, defined according to specified safety or functional objectives of the product in accordance with customer, statutory, or regulatory authority requirements.

#### 4.3.2 Design and Development Inputs

NASA GSFC implements GPR 8700.2 a design and development procedure, which establishes the process for providing design input, for generating design output, for performing design verification, and for handling design changes that occur as the result of design verification and/or product validation. Inputs related to product requirements are complete, unambiguous and are not in conflict with each other. They are reviewed for adequacy, and include:

- a. Functional and performance requirements;
- b. Applicable statutory and regulatory requirements;
- c. Where applicable, information derived from previous similar designs; and
- d. Other requirements essential for design and development.

#### 4.3.3 Design and Development Outputs

Outputs of design and development are documented in accordance with GPR 8700.2, the GSFC Design Development process. Design and development outputs are documented in a format that enables verification against design and development inputs, and are approved prior to release.

The Product Design Team (PDT) documents the design output in terms that are verified against design requirements.

Outputs:

- a. Meet the input requirements;
- b. Provide appropriate information for purchasing, production and for service provision;
- c. Contain or reference product acceptance criteria;
- d. Specify the Key characteristics of the product that are essential for its safe and proper use; and
- e. All pertinent data required to allow the product to be identified, manufactured, inspected, used and maintained are defined by the organization according to the Design Development process.



#### 4.3.4 Design and Development Review

GPR 8700.2, states that the PDL and the PDT prepare and present documentation for design reviews (see GPR 8700.4, Goddard Systems Reviews, and GPR 8700.6, Engineering Peer Reviews), as required by the design plan (See GPR 8700.1, Design Planning and Interface Management). The design plan specifies suitable stages of the project to conduct design and development reviews. Reviews take place according to the design and development process, results of design reviews are recorded in minutes which are maintained as a quality record. Other applicable documents to design and development review include GPR 7123.1 Systems Engineering.

Design and development reviews:

- a. Evaluate the results of design and development activities and determine if they fulfill requirements;
- b. Identify any problems or associated risks and propose necessary actions; and
- c. Include representatives of functions/organizations concerned with the design and development stage being reviewed to authorize progression to the next stage.

#### 4.3.5 Design and Development Verification

Design verification is planned and performed to ensure that the design and development outputs have satisfied the design and development input requirements. Records of the results of the verification and any necessary actions are maintained according to the GPR-8700.2. Some design and development verification methods may include:

- a. drawing checking;
- b. finite element analysis;
- c. breadboard/prototype tests;
- d. software code walk-throughs;
- e. electronic design tool simulations;
- f. mathematical simulations; and
- g. engineering peer reviews.

The Work Order Authorization (WOA) Form 4-30 or equivalent for software is used to document all functional and environmental tests for design verification and, where applicable, the WOA may be used to document other design verification activities (See GPR 5330.1).

#### 4.3.6 Design and Development Validation

Design and development validation is performed according to the design plan to ensure that the resulting product is capable of fulfilling the requirements for the specified or known intended use or application. Validation is completed prior to delivery whenever practicable. Records of the validation activities are maintained according to the design and development procedure GPR 8700.3.

#### 4.3.6.1 Design and Development Verification and Validation Testing

GPR 5330.1 describes the processing of products including in-process, final inspections, validation tests and test status. It describes and mandates the use of the Work Order Authorization (WOA) document, GSFC form 4-30.

A Product Validation Plan is developed by the PDL which identifies acceptance criteria for product validation, plus those characteristics that are essential to the safe and proper functioning of the product (see GPR 8700.3). Contents should address such things as functional tests, environmental tests, final analyses, and reviews.

Where tests are necessary for verification and validation, these tests are planned, controlled, reviewed, and documented to include the following:

- a. Test plans or specifications identify the product being tested and the Resources being used, define test objectives and conditions, parameters to be recorded, and relevant acceptance criteria;
- b. Test procedures describe the method of operation, the performance of the test, and the recording of the results;
- c. The correct configuration is submitted for the test;
- d. The requirements of the test plan and the test procedures are observed; and
- e. The acceptance criteria are met.

#### 4.3.6.2 Design and Development Verification and Validation Documentation

Design plan information is documented by the PDL in accordance with the applicable configuration management plan (see GPR 1410.2). Note that it may be appropriate to document design plan information as a portion of the Project Plan (per GPR 7120.5).

At the completion of design and / or development, the organization ensures that reports, calculations, test results, etc., demonstrate that the product definition meets the specification requirements for all identified operational conditions.

#### 4.3.7 Control of Design and Development Changes

Where product processing operations uncover problems that require a change in pre-planned and pre-approved work events, changes are recorded on the WOA, which is configuration controlled, and approved using the process stipulated in the Project documentation. In addition, the GSFC CM procedure, GPR 1410.2, defines the process for identifying, recording, verifying, validating and approving design changes. The review of the design and development changes includes an evaluation of the effect of the changes on constituent parts, systems, and delivered product. Records are maintained to show the results of the review and any necessary actions identified during the review. The process provides for customer or regulatory authority approval of changes, when required by contract or regulatory requirement.

## **4.4 Purchasing**

### **4.4.1 Purchasing Process**

GSFC utilizes a documented procurement process, GPR 5100.1 to ensure that the purchased product and/or service conform to the specified purchase requirements. The process outlines the extent of control required for suppliers and the purchased product dependent on the effect of the purchased product on subsequent product realization or the final product. Suppliers are evaluated and selected based on their ability to supply product or service in accordance with requirements as outlined in the process. Quality system requirements and criteria for selection, evaluation and re-evaluation are documented in relative referenced documents such as:

- a. FAR Subpart 46.2, Contract Quality Requirements;
- b. NPD 8730.5 NASA Quality Assurance Program Policy; and
- c. GPR 5100.2 Supplier Performance Evaluations.

Records of the evaluation and any necessary actions are maintained as quality records. The organization is responsible for the quality of all products purchased from suppliers, including Customer designated sources.

### **4.4.2 Purchasing Information**

Purchasing information describes the product to be purchased, including where appropriate:

- a. Requirements for approval;
- b. Requirements for qualification of personnel
- c. Quality Management System requirements
- d. Requirements from regulatory bodies such as FAR if applicable

Purchasing documents are reviewed to ensure the adequacy of requirements before orders are placed with the supplier.

### **4.4.3 Verification of Purchased Product**

GPR 4520.2 describes the process used to verify that purchased product meets specified purchase requirements. Purchased product is not used or processed until it has been verified as conforming to specified requirements. If test reports are used to verify purchased product, the data must meet applicable specifications. Test reports for raw materials are periodically validated, when verification activities are delegated to the supplier, the requirements are clearly defined and a record of delegations are maintained. Also, GPR 4520.2 describes the process for performing and documenting receiving inspection and test for incoming products to the GSFC in order to verify that specified requirements for the product are met.

All deliveries of incoming products covered by the scope of the GSFC MS are to be processed through GSFC's (Greenbelt and Wallops) Central Receiving operations in order to ensure that appropriate receiving inspection and test processes, as well as other related activities (e.g., security and equipment accountability processes), are followed. Materials purchased may be directly drop shipped to purchaser's location, but are still processed through Central Receiving.

## **4.5 Production and Service Provision**

### **4.5.1 Control of Production and Service Provision**

GSFC plans and carries out production and service provision under controlled conditions. Applicable planning considerations:

- a. Establishment of process controls and development of control plans where key characteristics are identified;
- b. Identification of in process verification points when adequate verification of conformance cannot be performed at a later stage of realization;
- c. Design, manufacture, and use of tooling so that variable measurements are taken, particularly for key characteristics;
- d. Special processes (See GPR 8072.1 Process Control procedure);
- e. Controlled conditions include as applicable;
- f. Availability of information that describes the characteristics of the product;
- g. Availability of work instructions;
- h. Use of suitable equipment;
- i. Availability and use of monitoring and measuring equipment;
- j. Implementation of monitoring and measurement;
- k. Implementation of release, delivery and post-delivery activities;
- l. Accountability for all product during manufacture (e.g., parts quantities, split orders, nonconforming product), part accountability to ensure nonconforming parts are dispositioned and isolated;
- m. Evidence that all manufacturing and inspection operations are completed as planned, or as otherwise documented and authorized;
- n. Provision for the prevention, detection and removal of foreign objects; and
- o. Monitoring and control of utilities and supplies such as water, compressed air, electricity and chemical products to the extent they affect product quality, and criteria for workmanship, which will be stipulated in the clearest practical manner (e.g., written standards, representative samples or illustrations).

In addition, GPR 8072.1, Process Control procedure establishes a consistent method for the control of production, installation, and servicing processes that directly affect the quality of products and the safety of personnel.

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#### 4.5.1.1 Production Process Verification

GSFC production operations are carried out in accordance with approved data. GPR 5330.1 describes the process for documenting the processing of GSFC products including in-process and final inspections and tests, and test status. In the event that multiple products are produced that are alike using the same process, the process verification is conducted the same way as for a single production article, but verifying the first article to the production process requirements. GPR 5330.1 describes the use of the WOA document, GSFC Form 4-30.

Approved data contains as necessary:

- a. Drawings, parts lists, process flow charts including inspection operations, production documents and inspection documents; for initial production article, and
- b. A list of specific and non-specific tools and numerical control machine programs required and specific instructions associated with their use.

#### 4.5.1.2 Control of Production Process Changes

The responsible organization processes change requests in accordance with documented procedure GPR 1410.2 Configuration Management process. The Configuration Control Board (CCB) chairperson is identified as the approving authority for Configuration Change Requests (CCRs). Disapproved change requests are closed or returned for correction and resubmittal. Approved change requests remain open until approved changes to the documentation are incorporated and verified. The configuration manager informs the originator of the disposition.

GSFC identifies and obtains acceptance of changes that require customer or regulatory authority approval in accordance with contract or regulatory requirements. Changes affecting process, production equipment, tools and programs are documented and procedures are available to control the implementation of changes. The results of changes to production processes are assessed to confirm that the desired effect is achieved without adverse effects to product quality.

#### 4.5.1.3 Control of Production Equipment, Tools and Software Programs

Production equipment tools and software programs are validated prior to use, maintained and inspected periodically according to documented procedures. Validation prior to production includes verification of the first article produced to the design data/specification. Storage requirements, including periodic preservation and condition checks, are established for production equipment or tooling storage. These documented procedures include:

- a. GPR 4520.2 Receiving Inspection and Test
- b. GPR 8710.3 Certification and Recertification of Ground-Based Pressure Vessels and Pressurized Systems;
- c. GPR 8700.7 Tool Control Program;

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- d. GPR 8719.1 Certification and Recertification of Lifting Devices and Equipment and its Operators; and
- e. GPR 8730.1 Calibration and Metrology.

#### **4.5.1.4 Post Delivery Support**

Where serving as a special requirement, service operation processes provide for:

- a. Anomaly reporting through Spacecraft on-Orbit Anomaly Reporting system (SOARS)
  - A method of collecting and analyzing in-service data;
  - Actions to be taken where problems are identified after delivery/launch, including investigation, reporting activities, and actions on service information consistent with contractual or regulatory requirements;
- b. The control and updating of technical documentation;
- c. The approval, control and use of repair schemes; and
- d. The controls required for offsite work.
- e. If applicable, education and training

#### **4.5.2 Validation of Processes for Production and Service Provision**

GSFC validates any processes for production and service provision where the resulting output cannot be verified by subsequent monitoring or measurement. This includes any processes where deficiencies become apparent only after the product is in use or the service has been delivered. Validation demonstrates the ability of the processes to achieve planned results. GPR 5330.1, Product Processing, Inspection, and Test defines the validation process.

Any special processes which cannot be verified by subsequent monitoring or measurement without destroying the product are validated by methods suitable to the process (e.g., lot samples or test coupons) can be referenced to in GPR 8072.1, Process Control. GSFC has documented processes for validation including:

- a. Defined criteria for review and approval of the processes, qualification and approval of special processes prior to use;
- b. Processes (including equipment and personnel) must be qualified prior to use. Therefore, the review and/ or approval criteria must be clearly defined;
- c. Operations and process parameters are controlled in accordance with documented procedures including changes to them; and
- d. Records needed for evidence that processes achieve planned results and the revalidation of the process.

#### **4.5.3 Identification and Traceability**

GSFC MS identifies the product throughout product realization and maintains the identification of the configuration of the product in order to identify any differences between the actual

configuration and the agreed configuration. GPR 1410.2 Configuration Management defines how this is done.

The product status is identified with respect to monitoring and measurement requirements. Where used, controls of acceptance authority media such as stamps, electronic signatures, or signoffs are defined in project-level configuration management procedures.

According to the level of traceability required, GSFC MS provides for:

- a. Identification to be maintained throughout the product life;
- b. An assembly, the identity of its components and the next higher assembly to be traced; and
- c. A sequential record of production of a given product, including manufacture, assembly, test, inspection, and acceptance.

#### **4.5.4 Customer Property**

GSFC exercises care with customer property while it is under the organizations control or being used. If any customer property is lost, damaged or otherwise found to be unsuitable for use, this is reported to the customer and records are maintained. GPR 4520.3, Control of Customer Supplied Product defines how customer property is handled.

A nonconformance report (NCR) is generated for any parts determined by production or receiving inspection as unfit for use. NCRs are reviewed for disposition in accordance with GPR 5330.1 or 4530.2, as appropriate.” The customer is provided a copy of the NCR as notification about the materials condition. The NCR is also retained as a quality record.

Customers documents are controlled and released on an as needed basis and are maintained according to GSFC records retention policies and processes. Intellectual property is controlled by the use of confidentiality and non-disclosure agreements with our employees and suppliers, or with written permission from the customer.

#### **4.5.5 Preservation of Product**

GSFC preserves the conformity of the product and constituent parts during internal processing and delivery to its intended destination. This preservation includes identification, handling, packaging, storage, and protection from foreign object damage (FOD). The following provisions are made when product specifications and/ or statutory/regulatory requirements apply:

- a. Cleaning;
- b. Prevention, detection and removal of foreign objects;
- c. Special handling of sensitive products; including products sensitive to electrostatic discharge (ESD)
- d. Marking and labeling, including safety warnings;



- e. Shelf life control and stock rotation; and
- f. Special handling for hazardous materials.

Documents required by the contract/order to accompany product are present at delivery and are protected against loss or deterioration.

#### **4.6 Control of Monitoring and Measuring Equipment**

GSFC determines the required monitoring and measurement to be undertaken and/or the monitoring/measuring equipment needed to provide the evidence of conformity of product to applicable requirements.

GSFC maintains a register of monitoring and measurement equipment as defined in GPR 8730.1, the Calibration and Metrology process. This process is consistent with monitoring and measurement requirements and includes:

- a. Equipment type with unique identification;
- b. Location;
- c. Frequency of checks and check method;
- d. Acceptance criteria;
- e. Calibrated or verified at specified intervals, or prior to use, against measurement standards traceable to international and national measurement standards;
- f. Equipment identified to determine calibration status;
- g. Safeguarded from adjustments that would invalidate the measurement result;
- h. Protected from damage/deterioration during handling, maintenance and storage; and
- i. Be recalled according to a defined method when requiring calibration.
- j. Be adjusted or re-adjusted as necessary.

In addition, Quality Assurance assesses and records the validity of the previous measuring results when the equipment is found not to conform to requirements. GSFC takes appropriate action on the equipment and any product affected. Records of the results of calibration and verification are maintained.

When used in the monitoring and measurement of specified requirements, the ability of computer software to satisfy the intended application is confirmed. This is undertaken prior to initial use and reconfirmed as necessary. GSFC ensures that environmental conditions are suitable for the calibrations (if in house), inspections, measurements and tests being conducted.

### **5. Measurement, Analysis and Improvement**

#### **5.1 General**

GSFC plans and implements the monitoring, measurement, analysis and improvement processes needed:



- a. To demonstrate conformity of the product;
- b. To ensure conformity of the Management System; and
- c. To continually improve the effectiveness of the Management System.

These processes are identified in documented procedures and include determination of applicable methods, including statistical techniques, and the extent of their use.

## **5.2 Monitoring and Measurement**

### **5.2.1 Customer Satisfaction**

Organizations capture, document and report customer satisfaction through the customers Bi – monthly Progress Report (BPR) at monthly MSRs. The organizations determine and define external customer satisfaction metrics as appropriate, based on the products and services provided. At a minimum, the organizations define the metric and establish a goal for each metric.

Customer Satisfaction metrics include:

- a. Product conformity;
- b. On time delivery performance;
- c. Customer complaints; and
- d. Corrective action requests.
- e. Perception such as surveys, customer data on delivered product quality, compliments

Plans are developed and implemented for customer satisfaction and improvement that address the deficiencies in the above areas by assessments and verify effectiveness of actions taken.

### **5.2.2 Internal Audit**

GSFC conducts internal audits in accordance with GPR 9980.1, Internal Audit Process. These audits are scheduled annually, at planned intervals to determine whether the Management System:

- a. Conforms to the planned arrangements to the requirements of AS 9100C, ISO 9001-2008 and to the MS requirements established by the organization; and
- b. Is effectively implemented and maintained.

An audit program has been designed, implemented and identifies an audit schedule based on the importance of processes, the areas to be audited, and the results of previous audits in compliance with internal audit process GPR 9980.1. The audit criteria, scope, frequency, methods, responsibilities, requirements for planning, reporting and maintaining results are defined in GPR 9980.1, Internal Audit Process.

The management responsible for the area being audited is responsible for ensuring that corrective actions are taken without undue delay to eliminate detected non conformities and their causes. Follow up activities include the verification of the actions taken and the reporting of verification results. Detailed tools and techniques such as checklists, process flow charts, or any similar method to support the audit of the MS are developed, maintained, and used according to the internal audit process. The acceptability of the selected tools is measured against the effectiveness of the internal audit process and overall organization performance. Records of the audits and their results are maintained.

### **5.2.3 Monitoring and Measurement of Process**

GSFC applies suitable methods for monitoring and, where applicable, measurement of the management system processes. These methods demonstrate the ability of the processes to achieve planned results. When planned results are not achieved, containment and corrective action and correction is taken, as appropriate, to ensure conformity of the product. In the event of process nonconformity, the organization:

- a. Takes appropriate action to correct the non-conforming process;
- b. Evaluates whether the process non-conformity resulted in product non-conformity;
- c. Identifies and controls the non-conforming product if applicable; and
- d. Determines if the process nonconformity is limited to a specific case or whether it could have affected other processes or products.

### **5.2.4 Monitoring and Measurement of Product**

GSFC monitors and measures the characteristics of the product to verify that product requirements are satisfied in accordance with GPR 5330.1. This is carried out at appropriate stages of the product realization process. Evidence of conformity with the acceptance criteria is maintained. Records such as WOA's and other life cycle documents that indicate the release authority for the product and service delivery does not proceed until all planned arrangements are satisfactorily completed, unless otherwise approved by a relevant authority and where applicable by the customer.

When critical items, including key characteristics are identified, they are monitored and controlled. When the organization uses sampling inspection as a means of product acceptance, the sample is statistically valid and appropriate for use. When required, the sample is submitted for customer approval. The product is not used until it has been inspected or otherwise verified as conforming to specified requirements.

## **5.3 Control of Nonconforming Product**

GSFC ensures that product that does not conform to product requirements is identified and controlled to prevent its unintended use or delivery. The controls and related responsibilities and authorities for processing and reporting nonconforming products are identified in GPD 8730.1,

GSFC Problem Reporting System, which includes references to MS requirements for process Nonconformance, Development (Phase C/D) product Nonconformance, Incoming product Nonconformance, and On Orbit Anomalies. Also, these referenced requirements documents define the responsibility and authority for the review and disposition of nonconforming product, and the process for approving personnel making these decisions. The term “nonconforming product” includes nonconforming product returned from a customer. In addition to any contract or regulatory authority reporting requirements, GSFC provides for a timely reporting of delivered nonconforming product that may affect reliability or safety. Notification includes a clear description of the nonconformity, which includes as necessary, parts affected, customer and/ or organization part numbers, quantity, and date delivered. Records of the nature of nonconformities and any subsequent actions taken, including concessions obtained, are maintained.

## **5.4 Analysis of Data**

GSFC determines, collects and analyzes appropriate data to demonstrate the suitability and effectiveness of the Management System and to evaluate where continual improvement of the MS is necessary. Appropriate data includes data generated as a result of monitoring and measurement and from other relevant sources. The analysis of data provides information relating to:

- a. Customer satisfaction;
- b. Conformance to product requirements; and
- c. Characteristics/trends of processes and products including opportunities for preventive action and suppliers.

## **5.5 Improvement**

### **5.5.1 Continual Improvement**

GSFC continually improves the effectiveness of its MS through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and MSR's. Actions taken to improve the MS are monitored to evaluate the effectiveness of the results.

### **5.5.2 Corrective Action**

GSFC takes action to eliminate the cause of nonconformities in order to prevent recurrence. Corrective actions are appropriate and address the nonconformities encountered. A documented process GPR 5340.2, Control of Process Nonconformances and Customer Complaints, and GPR 5100.4, Goddard Space Flight Center Supplier Assessment Process defines requirements for:

- a. Reviewing nonconformities (including customer complaints);
- b. Determining the causes of nonconformities;
- c. Evaluating the need for action to ensure that nonconformities do not reoccur;

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- d. Determining and implementing actions needed;
- e. Recording of the results of actions taken;
- f. Reviewing and approving effectiveness of corrective actions taken;
- g. Flow down of corrective action requirements to a supplier when it is determined that the supplier is responsible for the root cause;
- h. Specific actions where timely and/or effective corrective actions are not achieved; and
- i. Determine if additional nonconforming product exists based on the causes and take action as required.

### 5.5.3 Preventive Action

GSFC determines actions to eliminate the causes of potential nonconformities in order to prevent their occurrence. Preventive actions are appropriate to the effects of the potential nonconformity. A documented process GPR 5340.2, defines requirements for:

- a. Determining potential nonconformities and their causes;
- b. Evaluating the need for action to prevent the occurrence of nonconformities;
- c. Determining and implementing action needed;
- d. Recording of results of action taken; and
- e. Reviewing and approving preventive action and ensuring its effectiveness.

NOTE: Preventive actions, processes and products that are directly related to and supportive of flight projects (vs. the management system) are managed and maintained within, and by, their respective projects and configuration management systems. Examples include risks, watch lists, Failure Modes and Effect Analyses (FMEA), Fault Tree Analyses (FTA) etc.

## Appendix A – Definitions

Unless otherwise addressed herein, the definitions given in ISO 9001-2008, and AS9100C apply to the implementation of the MS. The following additional definitions are provided to assist in the understanding and application of the MS:

- A.1 Critical Items** - Those items (e.g., functions, parts, software, characteristics, processes) having significant effect on the product realization and use of the product; including safety, performance, form, fit, function, producibility, service life, etc.;
- A.2 Customer** - The recipient of a product or service provided by GSFC. For purposes of the MS, a customer is assumed to be external to NASA. NASA organizations with which GSFC transacts business are considered to be internal customers for purposes of the MS.
- A.3 Configuration Item** – Any item, document, record, hardware or software that is under configuration control.
- A.4 Customer Agreement** - Space Act Agreement, Program or Project Plan, Research Plan, or any similar commitment entered into by GSFC to deliver a product or service.
- A.5 Deviation** - An allowance for a departure from a requirement or specification before the departure has occurred.
- A.6 Directive** - A document that formally prescribes policy, procedures, and requirements necessary to conduct business. A directive is approved by the appropriate authority, and distributed through the GDMS.
- A.7 Exclusion** – An exception granted to the Product Realization provisions of ISO 9001-2008.
- A.8 Executive Council** - Collectively, senior leadership, including the Heads of all of the Directorates and functional offices that report to the Center Director.
- A.9 Goddard Directives Management System (GDMS)** - The electronic system that maintains the collection of directives and associated forms issued by GSFC along with the procedures for establishing and maintaining such collection.
- A.10 Key Characteristic** - An attribute or feature whose variation has a significant effect on product fit, form, function, performance, service life or producibility, that requires specific actions for the purpose of controlling variation.
- A.11 Management System Committee (MSC)** - A group of representatives from each GSFC Directorate, chaired by the MS Representative, responsible for advising the MS Representative regarding MS administration, maintenance, and status reporting.
- A.12 Management System Representative (MS Representative)** - A GSFC manager, designated by and reporting to upper management and/or directly to the Center Director, who has responsibility and authority for the effective implementation of the MS.
- A.13 Monthly Status Review** – Review meetings held monthly by executive management that address the continuing suitability and effectiveness of the GSFC MS policy, objectives and implementation.
- A.14 Product** – As used in this document, systems, hardware, software, data, documentation, services and/or processed material resulting from work activities at GSFC that have been defined to be in-scope to the MS.

- A.15 Record** – A document established to provide evidence of conformity to a defined requirement.
- A.16 Risk** - An undesirable situation or circumstance that has both a likelihood of occurring and a potentially negative consequence.
- A.17 Special Requirements** - Those requirements identified by the customer, or determined by the organization, which have high risks to being achieved, thus requiring their inclusion in the risk management process.
- A.18 Supplier** - An organization that provides a product or service to GSFC.
- A.19 Waiver** – An allowance for a departure from a requirement or specification after the departure has occurred.

## Appendix B – Acronyms

<b>AS</b>	Aerospace Standard
<b>BPR</b>	Bi-Monthly Progress Report
<b>CCB</b>	Configuration Control Board
<b>CCR</b>	Configuration Control Request
<b>CI</b>	Configuration Item
<b>CM</b>	Configuration Management
<b>EPR</b>	Engineering Peer Review
<b>FAR</b>	Federal Acquisition Regulation
<b>FY</b>	Fiscal Year
<b>FOD</b>	Foreign Object Damage
<b>FMEA</b>	Failure Mode and Effect Analysis
<b>FTA</b>	Fault Tree Analyses
<b>GDMS</b>	Goddard Directives Management System
<b>GID</b>	Goddard Interim Directive
<b>GPD</b>	Goddard Policy Directive
<b>GPR</b>	Goddard Procedural Requirements
<b>GSFC</b>	Goddard Space Flight Center
<b>GSR</b>	Goddard Systems Review
<b>IOC</b>	Institutional Operations Council
<b>ISO</b>	International Organization for Standardization
<b>KDP</b>	Key Decision Points
<b>MS</b>	Management System
<b>MSC</b>	Management System Committee
<b>MSR</b>	Monthly Status Review
<b>NASA</b>	National Aeronautics and Space Administration
<b>NCR</b>	Nonconformance Report
<b>NPD</b>	NASA Policy Directive
<b>NPR</b>	NASA Procedures and Guidelines
<b>NRRS</b>	NASA Record Retention Schedule
<b>OHR</b>	Office of Human Resources
<b>PDL</b>	Product Design Lead
<b>PDT</b>	Product Design Team
<b>PG</b>	Procedures and Guidelines
<b>PPBE</b>	Planning, Programming, Budgeting, and Execution
<b>QMS</b>	Quality Management System
<b>RMA</b>	Return Material Authorization
<b>SIP</b>	Strategic Implementation Plan
<b>SMA-D</b>	Safety and Mission Assurance Directorate
<b>TRL</b>	Technology Readiness Level
<b>WFF</b>	Wallops Flight Facility
<b>WI</b>	Work Instruction
<b>WOA</b>	Work Order Authorization

### Appendix-C Process Correspondence Matrix

Process Correspondence Between AS9100 Rev C, ISO 9001-2008 Requirements and NASA GSFC MS Documents			
AS9100 Rev C	ISO Requirement	Governing Directives	GPR/Process Owner
4.1 - General Requirements	4.1 - QMS General Requirements	GPR 1280.1 GSFC Quality Manual	Code 300
4.1 QMS General Requirements – Control of Outsourcing Processes	4.1 QMS General Requirements – Control of Outsourcing Processes	GPR 5100.1 Procurement	Code 200
		GPR 5100.2 Supplier Performance Evaluations	Code 200
		GPR 5100.3 Quality Assurance Letter of Delegation	Code 300
		GPR 5100.4 Goddard Space Flight Center Supplier Assessment Process	Code 300
4.2.1 – Documentation Requirements-General.	4.2.1 – Documentation Requirements-General	GPR 1280.1 GSFC Quality Manual	Code 300
		GPR 1440.8- Records Management	Code 200
4.2.2 - Quality Manual	4.2.2 - Quality Manual	GPR 1280.1 GSFC Quality Manual	Code 300
4.2.3 - Control of Documents	4.2.3 - Control of Documents	GPR 1410.1 Directives Management	Code 200
		GPR 1410.2 Configuration Management–ISO 9001-2008 only	Code 400
		GPR 1420.1 Forms Management	Code 200
		GPR 1440.8- Records Management	Code 200
		GPR 8070.5 GSFC Technical Standards	Code 300
4.2.4 - Control of Records	4.2.4 - Control of Records	GPR 1440.8 Records Management	Code 200
		NPR 1441.1 NASA Records Retention Schedules	NASA HQ
		NPR 7120.5 NASA Spaceflight Program and Project Management Requirements	NASA HQ
5.1 - Management Commitment	5.1 - Management Commitment	GPR1060.3 Goddard Governance System	Code 100
		GPR 1280.1 GSFC Quality Manual	Code 300
5.2 - Customer Focus	5.2 - Customer Focus	GPR 1280.1 GSFC Quality Manual	Code 300
		GPR1060.3 Goddard Governance System	Code 100
		GPR 5340.2 Control of Process Nonconformances and Customer Complaints	Code 300
5.3 - Quality Policy	5.3 - Quality Policy	GPR 1280.1 GSFC Quality Manual	Code 300
5.4.1 - Quality Objectives	5.4.1 - Quality Objectives	GPR 1280.1 GSFC Quality Manual	Code 300
		NPD 1001.0 2006 NASA Strategic Plan	NASA HQ
5.4.2 - Quality Management System Planning	5.4.2 - Quality Management System Planning	GPR1060.3 Goddard Governance System	Code 100
		GPR 1280.1 GSFC Quality Manual	Code 300
		NPD 1280.1 NASA Management System Policy	NASA HQ
5.5.1 - Responsibility,	5.5.1 - Responsibility,	GPR 1280.1 GSFC Quality Manual	Code 300



## Process Correspondence Between AS9100 Rev C, ISO 9001-2008 Requirements and NASA GSFC MS Documents

AS9100 Rev C	ISO Requirement	Governing Directives	GPR/Process Owner
Authority	Authority	GPR1060.3 Goddard Governance System	Code 100
		GPR 7120.9 Project Scientists Roles and Responsibilities	Code 600
5.5.2 - Management Representative	5.5.2 - Management Representative	GPR 1280.1 GSFC Quality Manual	Code 300
		GPR1060.3 Goddard Governance System	Code 100
5.5.3 - Internal Communications	5.5.3 - Internal Communications	GPR1060.3 Goddard Governance System	Code 100
		GPR 1280.1 GSFC Quality Manual	Code 300
		GPR 1700.8 GSFC Hazard Communication Program	Code 300
5.6.1 - Management Review - General	5.6.1 - Management Review - General	GPR1060.3 Goddard Governance System	Code 100
		GPR 1280.1 GSFC Quality Manual	Code 300
5.6.2 - Review Input	5.6.2 - Review Input	GPR1060.3 Goddard Governance System	Code 100
5.6.3 - Review Output	5.6.3 - Review Output	GPR1060.3 Goddard Governance System	Code 100
6.1 - Provision of Resources	6.1 - Provision of Resources	GPR 1280.1 GSFC Quality Manual	Code 300
6.2.1 - Human Resources - General	6.2.1 - Human Resources - General	GPR 3410.2 Employee Competence and Quality Management System Training	Code 113
		NPD 3410.2 Employee and Organizational Development	NASA HQ
6.2.2 - Competence, Awareness and Training	6.2.2 - Competence, Awareness and Training	GPR 3410.2 Employee Competence and Quality Management System Training	Code 113
		NPD 3410.2 Employee and Organizational Development	NASA HQ
		NPR 7120.5 NASA Spaceflight Program and Project Management Requirements	NASA HQ
		GPR- 8730.7 Laboratory Management	Code 500
6.3 - Infrastructure	6.3 - Infrastructure	GPR 8800.1 Facilities Utilization Program	Code 200
		GPR 8500.3 Waste Management	Code 200
		GPR 8500.5 Water Management	Code 200
		GPR 8710.8- GSFC Safety Program Management	Code 300
		GPR 8800.1- Facilities Utilization Program	Code 200
		NPR-2810.1- Security Of Information Technology	NASA HQ
6.4 - Work Environment	6.4 - Work Environment	GPD 8500.1- Environmental Policy And Program Management	Code 200
		GPR 1700.1 Occupational Safety Program at Goddard Space Flight Center	Code 300
		GPR 1700.5 Control of Hazardous Energy (Lockout/Tag out)	Code 300
		GPR 5330.1 Product Processing, Inspection and Test	Code 500

## Process Correspondence Between AS9100 Rev C, ISO 9001-2008 Requirements and NASA GSFC MS Documents

AS9100 Rev C	ISO Requirement	Governing Directives	GPR/Process Owner
		GPR 8710.3 Certification and Recertification of Ground-Based Pressure Vessels and Pressurized Systems	Code 500
		GPR 8500.3 Waste Management	Code 200
		GPR 8500.5 Water Management	Code 200
		GPR 8710.7 Cryogenic Safety	Code 300
		GPR 8715.5 Fire Protection	Code 300
		GPR 8719.1 Certification and Recertification of Lifting Devices and Equipment	Code 500
		GPR 8730.6 Electrostatic Discharge (ESD) Control	Code 300
		GPR 8830.1 Facility Operations Managers	Code 500
		GPR 8831.1 Uninterruptible Power Supply (UPS) Management Program by FMD	Code 200
		GPR 8834.1 Lifting Operations Requirements	Code 500
		NPR 8715.3 NASA General Safety Program Requirements	Code 300
		GPR 1700.7 Electrical Safety	Code 300
		GPR-1700.2- Chemical Hygiene Program	Code 300
		GPR-1700.6- Confined Space Program	Code 300
		GPR-1800.3- Bloodborne Pathogens Exposure Control	Code 250
		GPR 8710.7- Cryogenic Safety	Code 300
		GPR 8710.8- GSFC Safety Program Management	Code 300
		GPR-1840.1- Asbestos Management	Code 300
		GPR-1840.2- Industrial Hygiene Program	Code 300
		GPR-1860.1- Ionizing Radiation Program	Code 300
		GPR-1860.2- Laser Radiation Protection	Code 300
		GPR-1860.3- Radio Frequency Radiation Protection	Code 300
		GPR-1860.4- Ultraviolet And High Intensity Light Radiation Protection	Code 300
7.1 - Planning of Product Realization	7.1 - Planning of Product Realization	GPR 5330.1 Product Processing, Inspection and Test	Code 500
		GPR 7120.3 Management of Principal Investigator Mode Missions	Code 400
		NPR 7120.5 NASA Spaceflight Program and Project Management Requirements	Code 400
		GPR 7123.1 Systems Engineering	Code 400
		GPR 7120.4- Risk Management	Code 300

## Process Correspondence Between AS9100 Rev C, ISO 9001-2008 Requirements and NASA GSFC MS Documents

AS9100 Rev C	ISO Requirement	Governing Directives	GPR/Process Owner
		GPR 8715.7- GSFC Orbital Debris And End Of Mission Program Requirements	Code 300
		NPR 7120.8- NASA Research and Technology Program and Project Management Requirements	NASA HQ
		NPR 8705.5 - Technical Probabilistic Risk Assessment (PRA) Procedures for Safety and Mission Success for NASA Programs and Projects	NASA HQ
7.1.1 – Project Management	AS9100 Only	NPR 7120.5 NASA Space Flight Program and Project Management Requirements	Code 400
7.1.2 – Risk Management	AS9100 Only	GPR 7120.4 Risk Management	Code 300
7.1.3 – Configuration Management	Covered under Document clause	GPR 1410.2 Configuration Management	Code 400
7.1.4 Control of Work Transfers	AS9100 Only	GPR 6400 Logistics support.	Code 200
7.2.1- Determination of Requirements Related to the Product	7.2.1 - Determination of Requirements Related to the Product	GPR 7120.3 Management of Principal Investigator Mode Missions	Code 400
		NPR 7120.5 NASA Spaceflight Program and Project Management Requirements	Code 400
		GPR 8715.7- GSFC Orbital Debris And End Of Mission Program Requirements	Code 300
7.2.2 Review of Requirements to the Product	7.2.2 - Review of Requirements Related to the Product	GPR 1060.3 Goddard Governance System	Code 100
		GPR 8700.4 Goddard Systems Reviews	Code 300
		NPR 7120.5 NASA Spaceflight Program and Project Management Requirements	Code 400
		GPR 8700.6 Engineering PEER reviews	Code 500
		GPR 7120.4 Risk Management	Code 300
		GPR 8715.7- GSFC Orbital Debris And End Of Mission Program Requirements	Code 300
		GPR-1400.1- Waiver Processing	Code 300
		NPR 7120.8- NASA Research and Technology Program and Project Management Requirements	NASA HQ
		NPR 8705.5 - Technical Probabilistic Risk Assessment (PRA) Procedures for Safety and Mission Success for NASA Programs and Projects	NASA HQ
7.2.3 Customer Communication	7.2.3 - Customer Communications	GPD 8730.1 GSFC Problem Reporting System	Code 300
		GPR 1060.3 Goddard Governance System	Code 100
		GPR 1280.1 The Quality Manual	Code 300

## Process Correspondence Between AS9100 Rev C, ISO 9001-2008 Requirements and NASA GSFC MS Documents

AS9100 Rev C	ISO Requirement	Governing Directives	GPR/Process Owner
		GPR 1400.1 Waiver Processing	Code 300
		GPR 5340.2 Control of Non conformances	Code 300
		NPR 7120.5 NASA Spaceflight Program and Project Management Requirements	Code 400
7.3.1 Design Development Planning	7.3.1 Design Development Planning	GPR 7120.4- Risk Management	Code 500
		GPR 7123.1- Systems Engineering	Code 400
		GPR 8070.4- Administration and Application of Goddard Rules for Design, Development, Verification and Operation of Flight Systems	Code 300
		GPR 8070.5- GSFC Technical Standards	Code 300
		GPR 8700.1- Design Planning and interface Management	Code 500
		GPR 8700.2- Design Development	Code 500
		GPR 7150.1- Software Project Process Initiation	Code 500
		GPR 7150.4- Software Safety and Software Reliability Process	Code 300
		GPR 8715.7- GSFC Orbital Debris And End Of Mission Program Requirements	Code 300
		NPR 7120.5- NASA Spaceflight Program and Project Management Requirements	NASA HQ
		NPR 7120.8- NASA Research and Technology Program and Project Management Requirements	NASA HQ
7.3.2 Design and Development Inputs	7.3.2 - Design and Development Inputs	GPR 7120.4- Risk Management	Code 300
		GPR 8070.4- Administration and Application of Goddard Rules for Design, Development, Verification and Operation of Flight Systems	Code 300
		GPR 8700.2- Design Development	Code 500
		NPR 8705.5 - Technical Probabilistic Risk Assessment (PRA) Procedures for Safety and Mission Success for NASA Programs and Projects	NASA HQ
7.3.3 - Design and Development Outputs	7.3.3 - Design and Development Outputs	GPR 8700.2 Design Development	Code 500
		NPR 7120.5 NASA Spaceflight Program and Project Management Requirements	NASA HQ
		NPR 7120.8- NASA Research and Technology Program and Project Management Requirements	NASA HQ
7.3.4 - Design and Development Review	7.3.4 - Design and Development Review	GPR1060.3 Goddard Governance System	Code 100
		GPR 8700.4 Goddard Systems Reviews	Code 300

## Process Correspondence Between AS9100 Rev C, ISO 9001-2008 Requirements and NASA GSFC MS Documents

AS9100 Rev C	ISO Requirement	Governing Directives	GPR/Process Owner
		GPR 8700.6 Engineering Peer Reviews	Code 500
		NPR 7120.5 NASA Spaceflight Program and Project Management Requirements	NASA HQ
		NPR 8705.5 - Technical Probabilistic Risk Assessment (PRA) Procedures for Safety and Mission Success for NASA Programs and Projects	NASA HQ
7.3.5 - Design and Development Verification	7.3.5 - Design and Development Verification	GPR 7123.1 Systems Engineering	Code 400
		GPR 8700.3 Design Validation	Code 500
7.3.6 - Design and Development Validation	7.3.6 - Design and Development Validation	GPR 8700.3 Design Validation	Code 500
7.3.6.1 -- Design and Development Verification and Validation Testing	AS9100 Only	GPR 5330.1 Product Processing Inspection and Test	Code 500
7.3.6.2 -- Design and Development Verification and Validation Testing Documentation	AS9100 Only	GPR 1410.2 Configuration Management (AS9100 Only)	Code 400
7.3.7 - Control of Design and Development Changes	7.3.7 - Control of Design and Development Changes	GPR 1410.2 Configuration Management	Code 400
		GPR 8700.2 Design Development	Code 500
7.4.1 - Purchasing Process	7.4.1 - Purchasing Process	GPR 5100.1 Procurement	Code 200
		GPR 5100.2 Supplier Performance Evaluations	Code 200
		GPR 5100.4 Supplier Quality Audits	Code 300
		GPR 5100.5 Government Cost Estimates for Acquisitions Exceeding the Micro-purchase Threshold	Code 100
7.4.2 - Purchasing Information	7.4.2 - Purchasing Information	GPR 5100.1 Procurement	Code 200
		GPR 5100.2 Supplier Performance Evaluations	Code 200
7.4.3 - Verification of Purchased Product	7.4.3 - Verification of Purchased Product	GPR 4520.2 Receiving Inspection and Test	Code 200
		GPR 5100.1 Procurement	Code 200
		GPR 5100.3 Quality Assurance Letter of Delegation	Code 300
		GPR 5330.1 Product Processing, Inspection, and Test	Code 500
		GPR 5340.3 Preparation and Handling of Safe Alerts and Advisories	Code 300
7.5.1 - Control of Production and Service Provision	7.5.1 - Control of Production and Service Provision	GPR 4100.1 Management of Shelf-Life Items	Code 400
		GPR 5330.1 Product Processing, Inspection,	Code 500

## Process Correspondence Between AS9100 Rev C, ISO 9001-2008 Requirements and NASA GSFC MS Documents

AS9100 Rev C	ISO Requirement	Governing Directives	GPR/Process Owner
		and Test	
		GPR 5340.3 Preparation and Handling of Safe Alerts and Advisories	Code 300
		GPR 6400.1 Logistics Support	Code 400
		GPR 8072.1 Process Control	Code 500
		GPR 8700.7 Tool Control Program	Code 500
7.5.1.1 - Production Process Verification	AS9100 Only	GPR 5330.1 Product Processing, Inspection, and Test	Code 500
7.5.1.2 - Control of Production Process Changes	AS9100 Only	GPR 1410.2 Configuration Management process	Code 400
7.5.1.3 - Control of Production Equipment Tools and Software Programs	AS9100 Only	GPR 8710.3 Certification and Recertification of Ground-Based Pressure Vessels and Pressurized Systems	Code 500
		GPR 8700.7 Tool Control Program	Code 500
		GPR 8719.1 Certification and Re certification of Lifting Devices and Equipment and its Operators	Code 500
		GPR 8730.1 Calibration and Metrology	Code 500
7.5.1.4 - Post Delivery Support	AS9100 Only	GPR 6400.1 Logistics Support	Code 200
		GPR 8000.1 GSFC Mission and Safety Collision On Launch Assessment (COLA) Requirements	Code 300
		GPR-8715.7 GSFC Orbital Debris and End of Mission Program Requirements	Code 300
7.5.2 - Validation of Processes for Production and Service Provision	7.5.2 - Validation of Processes for Production and Service Provision	GPR 5330.1 Product Processing, Inspection, and Test	Code 500
		GPR 8072.1 Process Control	Code 500
7.5.3 - Identification and Traceability	7.5.3 - Identification and Traceability	GPR 1410.2 Configuration Management	Code 400
		GPR 4100.1 Management of Shelf-Life Items	Code 200
		GPR 5330.1 Product Processing, Inspection, and Test	Code 500
		GPR 8730.1 Calibration and Metrology	Code 500
7.5.4 - Customer Property	7.5.4 - Customer Property	GPR 4520.2 Receiving Inspection and Test	Code 200
		GPR 5330.1 Product Processing, Inspection, and Test	Code 500
		GPR 4530.3 Control of Customer Supplied Product	Code 200
		GPR 6400.1 Logistics Support	Code 200
7.5.5 - Preservation of Product	7.5.5 - Preservation of Product	GPR 4100.1 Management of Shelf-Life Items	Code 200
		GPR 6400.1 Logistics Support	Code 200
		GPR 8730.6 Electrostatic Discharge (ESD)	Code 300

## Process Correspondence Between AS9100 Rev C, ISO 9001-2008 Requirements and NASA GSFC MS Documents

AS9100 Rev C	ISO Requirement	Governing Directives	GPR/Process Owner
		Control	
		GPR 8700.7 Tool Control	Code 500
7.6 - Control of Monitoring and Measuring Devices	7.6 - Control of Monitoring and Measuring Devices	GPR 8730.1 Calibration and Metrology	Code 500
		GPR 8700.7 Tool Control	Code 500
8.1 - Measurement, Analysis and Improvement-General	8.1 - Measurement, Analysis and Improvement-General	GPR1060.3 Goddard Governance System	Code 100
		GPR 5330.1 Product Processing, Inspection, and Test	Code 500
		GPR 5340.2 Control of Non conformances and Customer Complaints	Code 300
		GPR 8072.1 Process Control	Code 500
		GPR 8730.1 Calibration and Metrology	Code 500
8.2.1 - Customer Satisfaction	8.2.1 - Customer Satisfaction	GPR 1060.3 Goddard Governance System	Code 100
		GPR 1280.1 Quality Manual	Code 300
		GPR 5340.4 Problem Reporting and Problem Failure Reporting	Code 300
		GPD 8730.1 Goddard Problem Reporting for Processes, Products, and Safety	Code 300
8.2.2 - Internal Audit	8.2.2 - Internal Audit	GPR 9980.1 Internal Audit System	Code 300
8.2.3 - Monitoring and Measurement of Processes	8.2.3 - Monitoring and Measurement of Processes	GPR1060.3 Goddard Governance System	Code 100
		GPR 5340.2 Control of Non conformances	Code 300
		GPR 8730.1 Calibration and Metrology	Code 500
		GPR 8072.1 Process Control	Code 500
		GPR 9980.1 Internal Audit System	Code 300
8.2.4 - Monitoring and Measurement of Product	8.2.4 - Monitoring and Measurement of Product	GPR1060.3 Goddard Governance System	Code 100
		GPR 5330.1 Product Processing, Inspection, and Test	Code 500
		GPR 8072.1 Process Control	Code 500
		GPR 8730.1 Calibration and Metrology	Code 500
		GPR 9980.1 Internal Audit System	Code 300
8.3 - Control of Nonconforming Product	8.3 - Control of Nonconforming Product	GPR 5340.2 Control of Non conformances and Customer Complaints	Code 300
		GPR 5340.3 Preparation and Handling of Alerts, Safe Alerts and Advisories	Code 300
		GPR 5340.4 Problem Reporting and Problem Failure Reporting	Code 300
		GPR 5240.5 On-Orbit Anomaly Management	Code 300
8.4 - Analysis of Data	8.4 - Analysis of Data	GPR1060.3 Goddard Governance System	Code 100
		GPR 1280.1 Quality Manual	Code 300
		GPR 8070.2 Statistical Techniques	Code 500
8.5.1 Continual Improvement	8.5.1 Continual Improvement	GPR 1060.3 Goddard Governance System	Code 100



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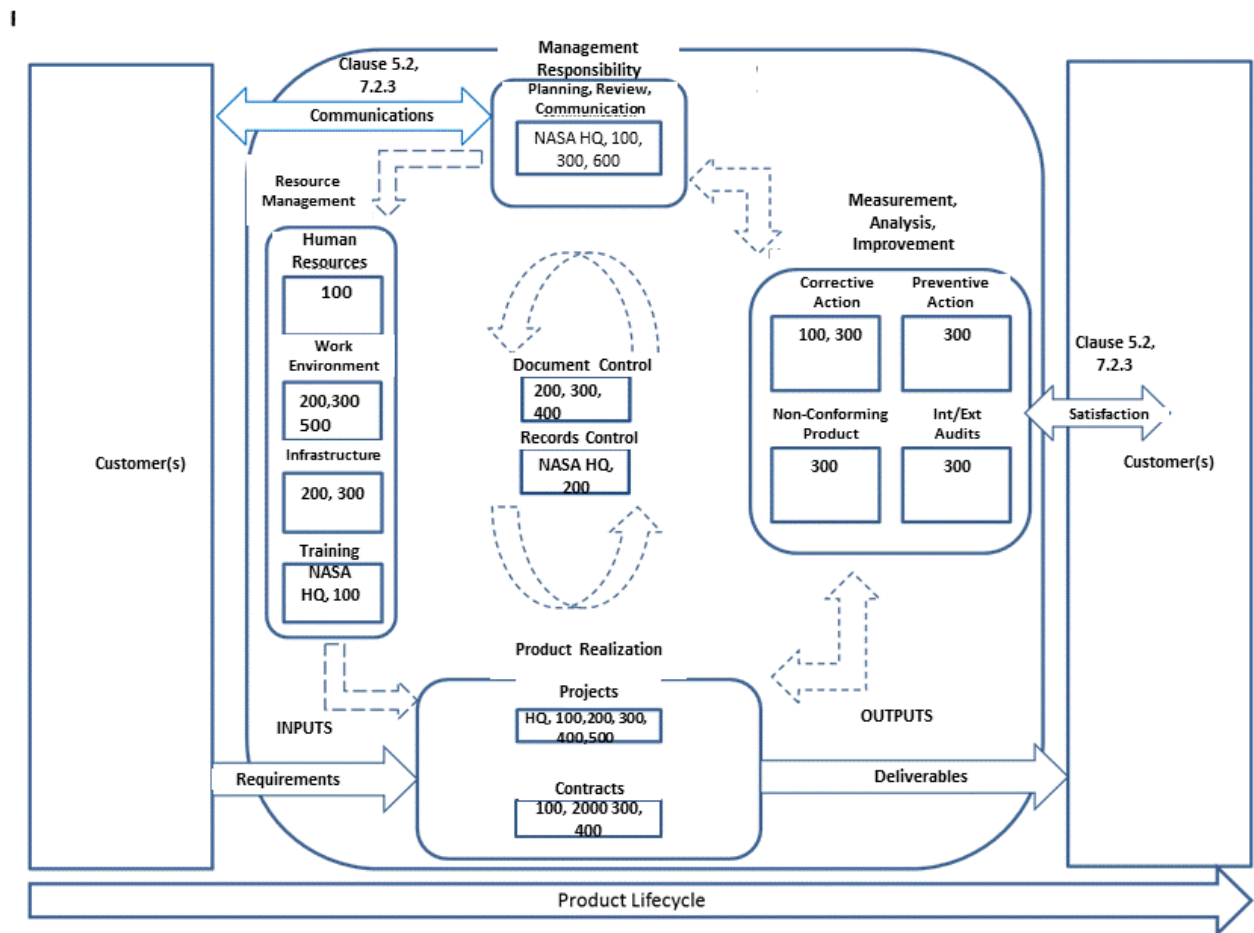
**Process Correspondence Between  
AS9100 Rev C, ISO 9001-2008 Requirements and NASA GSFC MS Documents**

AS9100 Rev C	ISO Requirement	Governing Directives	GPR/Process Owner
		GPR 5340.2 Control of Non conformances and Customer Complaints	Code 300
		GPR 9980.1 Internal Audit System	Code 300
8.5.2 - Corrective Action	8.5.2 - Corrective Action	GPR 5340.2 Control of Non conformances and Customer Complaints 5100.4, Goddard Space Flight Center Supplier Assessment Process	Code 300
8.5.3 - Preventive Action	8.5.3 - Preventive Action	GPR 5340.2 Control of Non conformances and Customer Complaints 5100.4, Goddard Space Flight Center Supplier Assessment Process	Code 300



## APPENDIX D

### NASA GSFC Process Map



### CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	07/31/03	<p>Entire manual was rewritten in response to ISO 9001:2000 requirements. GPG number changed as a result of release of NPD 1280.1. This baseline version replaces GPG 8730.3D. Substantive changes from GPG 8730.3D are:</p> <ul style="list-style-type: none"> <li>▪ Quality policy signature page eliminated.</li> <li>▪ GSFC organization chart (figure 1) replaced by reference to on-line chart maintained by OHR.</li> <li>▪ 1.2.2: Language added to align QMS scope with GSFC Strategic Implementation Plan (SIP). First paragraph expanded to address infrastructure considerations.</li> <li>▪ 1.2.2c: Moved mission operations to this process.</li> <li>▪ 1.2.2e: Added to align with SIP.</li> <li>▪ Deleted specific identification of QMSR by position in favor of more flexible description in 2.5.3.</li> <li>▪ 2.2 added to address ISO 9001:2000 requirement.</li> <li>▪ 2.4 added to align with SIP and to address ISO requirements with respect to objectives, objectives metrics, and analysis.</li> <li>▪ 2.5.2 second paragraph added to address data analysis and continual improvement requirements of ISO 9001:2000.</li> <li>▪ 2.5.4 added to address ISO 9001:2000 requirement.</li> <li>▪ Section 3 re-written for clarity and visibility. Waivers previously addressed in Quality Planning (4.2.3) of GPG 8730.3D.</li> <li>▪ Figure 1 added to address, in conjunction with Table 1, ISO 9001:2000 requirement regarding process interaction description.</li> <li>▪ Table 1 expanded to address correspondence between ISO 9001:2000 requirements and implementing documents. Table correspondence used to eliminate redundant and ISO 9001:1994 related sections 4.2 through 4.20 of GPG 8730.3D.</li> </ul>
A	07/27/04	<ul style="list-style-type: none"> <li>▪ P.4(c) title change and hyperlink established. Date left off of Plan title to accommodate future Plan updates without requiring Quality Manual update.</li> <li>▪ P.8 – Record types separated. Custodians and record retention schedules re-defined.</li> <li>▪ 1.1 – Deleted sentence “These directives have been updated to conform to ISO 9001-2000”.</li> <li>▪ 2.4 – Rewritten to reflect current GSFC Strategic Implementation Plan mission goals.</li> <li>▪ Table 1 – Updated titles of GPG 3410.2, GPG 7120.1, and GPG 5340.3. Deleted references to canceled GPG 7120.2.</li> </ul>

B	12/29/04	As directed during the FY04 Center Rules Review, the Responsible Office modified this document to remove requirements that were no longer needed and to clearly distinguish requirements from supporting information. Administrative changes were made throughout to correct responsible organization names and codes, and to retitle Goddard Procedures and Guidelines (GPG) to Goddard Procedural Requirements (GPR). All changes were reviewed and approved by the Goddard Quality Management System Council (QMSC).
C	02/14/06	<ul style="list-style-type: none"> <li>• All Quality Management System references changed to Management System.</li> <li>• Deleted all references to the GSFC FY Implementation Plan.</li> <li>• P.4c reference name changed to accommodate changing FY documents.</li> <li>• P.4d reference updated.</li> <li>• P.4e through h added.</li> <li>• P.10a – replaced “...as defined through...” with “...under...”.</li> <li>• P.10c – replaced “legal” with “similar”.</li> <li>• P.10d added.</li> <li>• P.10o modified.</li> <li>• 1.1 – Third and fourth sentences revised to remove Table 1 from the directive and authorize the Office of Mission Success to maintain a reference list of directives that can be more readily updated to reflect current directives.</li> <li>• 1.2.4 – GPR reference update from 1440.7 to 1440.8.</li> <li>• 2.4 – Section re-written to reflect establishment of NPR 1000.0 and ensuing NASA Strategic Plan in lieu of a Center Implementation Plan.</li> <li>• 2.5.2, second paragraph – Elimination of provision for QMSC advising the QMSR on requests for waivers.</li> <li>• 2.6 – Replaced “semi-annual” with “at prescribed intervals” and inserted “process and” in third sentence</li> <li>• 3 – Re-written to reflect use of GSFC Form 4-42.</li> <li>• Removed Table of QMS Directive Correspondence with ISO requirements to QMS web page to accommodate real-time update.</li> </ul>
D	03/06/09	<p>General update to add new template and acronym list, remove unused definitions, and correct all links. Changed references to ISO 9001 to comply with GSFC Registration. Reorganized section 2. Made the following changes:</p> <ul style="list-style-type: none"> <li>• Changed authority directive in P.3.</li> <li>• Added use of Goddard Interim Directives.</li> <li>• Retitled several sections for clarity.</li> </ul>

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		<ul style="list-style-type: none"><li>• Rewrote GSFC Quality Policy and added requirement for annual review.</li><li>• Replaced all references to Code 170 with Code 300.</li><li>• Changed overall authority &amp; responsibility for MS from Executive Council to Management System Representative.</li><li>• Updated section 3 to add waiver process from new GPR 1400.1 and disallow any waiver to ISO 9001.</li></ul>
E	1/14/13	Complete re-write of document to include structure of ISO and AS9100 requirements, referenced all pertinent documents